

Most of the recent reports on infectious hepatitis epidemics have concerned children in schools and institutions. The subjects of the epidemic in the Elgin State Hospital were adult mental patients.

Infectious Hepatitis Epidemic in a Mental Hospital

By OTTO L. BETTAG, M.D., FREDERICK PLOTKE, M.D.,
WERNER TUTEUR, M.D., and GUDRUN HERBORN, M.D.

DISCOVERY of any communicable disease in a mental hospital is cause for special concern. The inability or reluctance of many patients to verbalize their physical complaints frequently minimizes or rules out the possibility of early discovery and treatment. Then, too, overcrowded living quarters, intimate contact, and promiscuous defecation habits are conducive to the extension of communicable disease.

For a disease such as infectious hepatitis, poor personal hygiene and resultant unsanitary conditions constitute particularly formidable obstacles to the development of effective control measures. Certain segments of the patient population, by the very nature of their mental illness, are unable or unwilling to cooperate fully in control measures necessary to reduce the danger of an epidemic.

Thus, at Illinois' Elgin State Hospital for the mentally ill, about 40 miles northwest of

Chicago, such conditions contributed to the spread of infectious hepatitis cases, which occurred in unprecedented number from October 20, 1953 to March 15, 1954. Altogether there were 100 cases in the adult patient population of about 6,800 (see table).

Ninety-five of the 100 cases occurred in three overcrowded cottages on the north side of the grounds, Hirsch, Holden, and Hawley, housing regressed and untidy women patients. The remaining 5 cases occurred in 4 widely scattered cottages and wards for men, located on the opposite side of the grounds (fig. 1). Two of the men's cottages, Wilson, 1 case, and Kilbourne, 2 cases, housed deteriorated and untidy patients.

In general the epidemic did not follow a definite pattern. Explosive outbursts in the three women's wards were followed by a leisurely development of secondary cases. Among the men, 3 of the 4 wards developed no additional cases. Brodribb (1) and others have noted the appearance of cases in periodic batches, approximating monthly intervals.

The highest concentration of cases appeared at Hirsch Cottage, where the first two cases were found on October 20, 1953. From that date until February 13, 1954, there were 62 infectious hepatitis cases among the 267 severely regressed residents, an attack rate of 23 percent

Dr. Bettag is director of the Illinois Department of Public Welfare. Dr. Plotke, chief of the department's public health service, was recently appointed assistant clinical professor of preventive medicine at the Stritch School of Medicine, Loyola University. Dr. Tuteur is clinical director and Dr. Herborn is staff physician at the Elgin State Hospital in Illinois.

(fig. 2). The rated bed capacity is 83 patients per unit.

Holden Cottage, adjacent to Hirsch, had the second highest attack rate, 8.7 percent. From February 8 to March 15, 1954, 17 cases occurred among 194 aged, ambulatory, deteriorated women patients. The rated bed capacity of this cottage is 96 patients.

At Hawley Cottage, separated from Hirsch by cottages and grounds, 16 infectious hepatitis cases were observed from February 2 through February 20, 1954. These cases involved 6.5 percent of the 244 generally elderly and disturbed patients in the cottage. Like Hirsch the rated bed capacity is 83 patients per unit. Figure 3 shows the distribution of cases at Holden and Hawley.

Single cases occurred at Wilson Cottage December 15, 1953, and the annex, December 23. Two cases occurred at Kilbourne Cottage January 14, 1954, and one case at B I, a ward in the administration building, January 17.

No infectious hepatitis was found in any of the hospital employees or any of their family members. Approximately 1,000 employees working on a 7-day 3-shift schedule look after the welfare of the patients. The personnel live on the grounds, in the city of Elgin, or in the surrounding area. They were permitted to circulate freely on the grounds and in the town.

The employee experience at Elgin varies from that noted by Capps and associates (2) in an orphanage for children under 3 years of age. Over a period of 8 years, 72 student nurses and 3 other adults contracted infectious hepatitis from the children. Outbreaks were ultimately eliminated by emphasis on aseptic nursing techniques.

Epidemiological Investigation

Upon recognition of the epidemic an immediate, diligent investigation was made to discover the mode of transmission. The propagation of the infection by a common vehicle was considered, but so far as could be determined the water, food, and milk supplies were not contaminated. The results of all standard bacteriological tests were within the accepted normal limits. All plumbing fixtures are equipped with backflow preventers, and there was no back stoppage in

the sewage disposal systems on the involved wards. Furthermore, only 7 of the 26 cottages using the common water supply and sewage disposal system at the institution experienced an outbreak. The individual syringe technique is practiced throughout the institution in the immunization program.

Although no cases were observed among the employees, the possibility that they might harbor the virus and unwittingly spread the infection was always considered. Employee practice of proper hygiene, particularly frequent handwashing, was stressed as a precautionary measure both for themselves and their patients.

Despite investigation and followup, the exact vehicle of contamination or mode of transmission was never ascertained. While the habits and practices of the patients lend credence to the fecal-oral route, suggested by Lilienfeld and others (3) as the general mode of transmission, the relatively confined area of the spread of attack, in the absence of contradictory evidence, points to a carrier as the most likely source of origin.

Diagnosis and Management

It is generally conceded, that although mortality from infectious hepatitis is low, its protracted convalescent period and possible liver

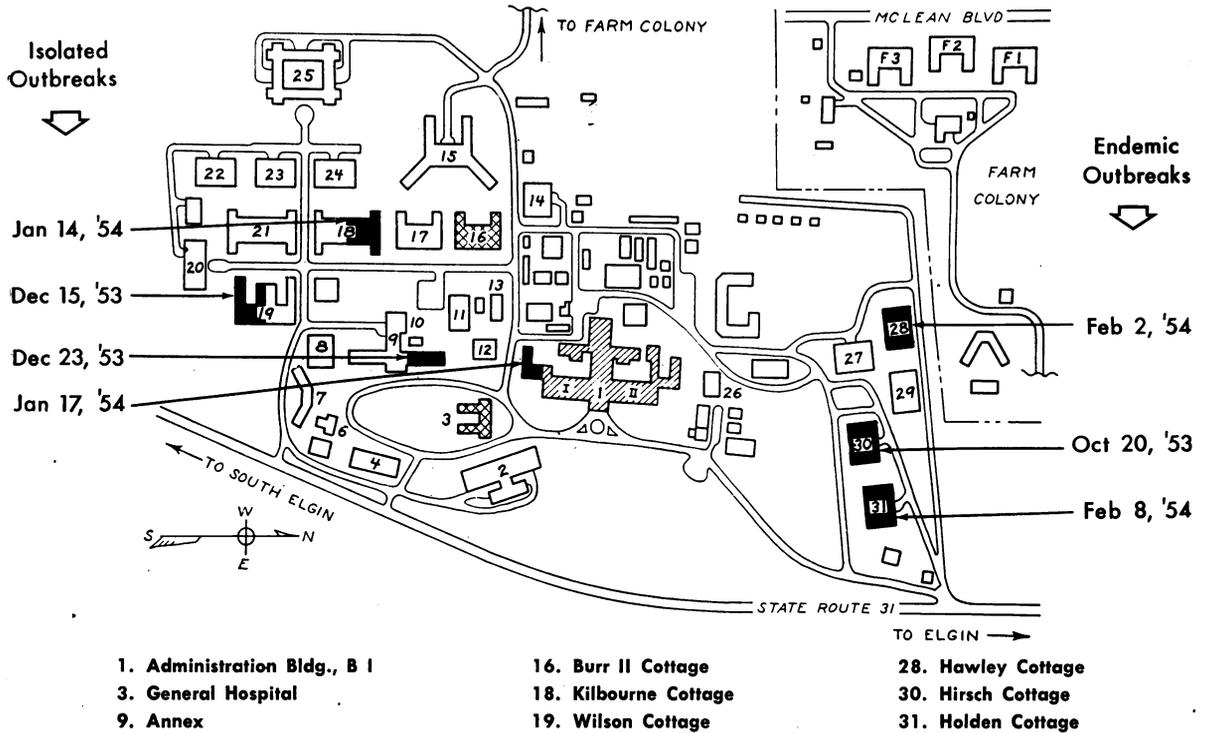
Age and sex distribution of infectious hepatitis patients, Elgin (Ill.) State Hospital

| Age (years) | Women | Men | Total |
|-------------|-------|-----|-------|
| 20-30 | 10 | 0 | 10 |
| 31-40 | 22 | 2 | 24 |
| 41-50 | 21 | 3 | 24 |
| 51-60 | 16 | 0 | 16 |
| 61-70 | 12 | 0 | 12 |
| 71-80 | 11 | 0 | 11 |
| 81-90 | 3 | 0 | 3 |
| Total | 95 | 5 | 100 |

damage, particularly in adults, warrants careful and extended followup and treatment in the early stages if serious after-effects are to be avoided.

The outstanding and most common clinical symptoms among the hepatitis patients were fatigue, listlessness, headaches, anorexia, nau-

Figure 1. Patient residences at Elgin State Hospital, Illinois.



sea, and diarrhea. Jaundice was observed in about one-third of the cases. All contacts, residents as well as employees in wards housing patients with infectious hepatitis, were given screening tests, including cephalin flocculation and urine urobilinogen. Residents exhibiting suspicious clinical or laboratory findings of the infection were sent to bed for observation pending confirmation of the diagnosis.

On discovery, the patients with infectious hepatitis were isolated and the affected cottages were quarantined. With the exception of the administration of gamma globulin and achromycin and special regimens for the acutely ill, the treatment and control measures were similar at the isolation units.

Preventive measures included separate garbage disposal and linen pickup. Food was served on disposable paper dishes. The basic treatment plan was relatively simple. It consisted of strict bed rest, a diet high in proteins and carbohydrates and low in fat content, a daily subcutaneous injection of 100 mg. of vitamin B₁, and intravenous injection of isotonic fluids when there were indications of dehydration.

For Hawley and Holden hepatitis patients, an isolation unit was established at Hawley Cottage. The mounting number of Hirsch patients required various arrangements for their isolation and care.

Shortly after the discovery of the first two cases at Hirsch on October 20, a special isolation unit was set up within the cottage, and the cottage was placed under modified quarantine.

Figure 2. Distribution of infectious hepatitis cases at Hirsch Cottage.

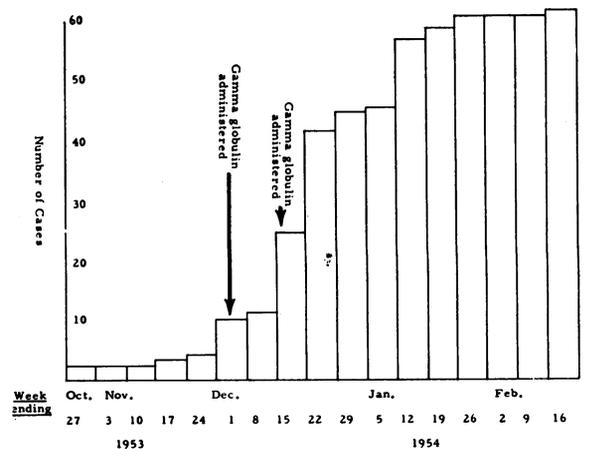
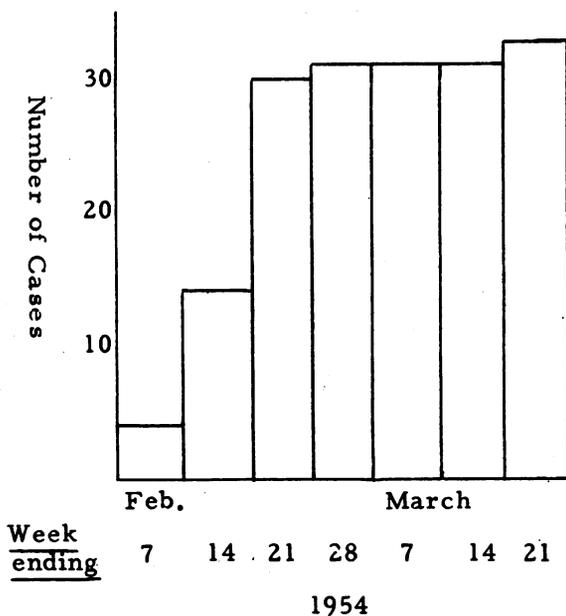


Figure 3. Distribution of infectious hepatitis cases at Hawley and Holden Cottages.



Patients were not permitted visitors from inside or outside the institution grounds, nor were they permitted to leave the cottage.

After December 1, 1953, when 10 Hirsch residents had developed the disease, all the sick patients were transferred to the institution's acute disease hospital.

By December 15, when the Hirsch cases totaled 25, the limited facilities of the acute disease hospital were severely taxed, and the infectious hepatitis cases constituted a possible hazard to the other hospitalized patients. A special isolation unit for Hirsch hepatitis patients was set up in Burr II Cottage, an infirmary for women on the south side of the grounds.

The Burr isolation ward was created by subdividing 1 of the 2 dormitories. The entire cottage, with an average of 193 patients, was quarantined.

On January 14, 1954, the Hirsch patients, 57 by this time, were returned to Hirsch Cottage, which continued under quarantine. Attending nursing personnel moved with the patients, and a special unit designated for recuperation purposes functioned until April 18, 1954.

On arrival at the Burr isolation unit, the majority of the patients exhibited mild symptoms of infectious hepatitis—diarrhea and

vomiting which stopped in a few days. Several had a moderate degree of liver enlargement.

Ten patients were seriously ill upon arrival. They developed temperatures ranging up to 104° F., severe jaundice, diarrhea, and vomiting, icterus indexes up to 10, and cephalin flocculation tests of 4-plus intensity.

Treatment of the 10 severely ill patients was supplemented by 500 mg. of aureomycin administered four times a day. Five percent glucose in saline infusions, together with vitamins B and C, were given when indicated.

Five of these patients, who exhibited low blood pressure, experienced decompensation of the cardiovascular system. They received supportive therapy in the form of digitalis, coramine, and caffeine.

One patient developed severe bilateral parotitis, in all probability caused by inadequate oral hygiene. One epileptic in this group continued to receive anticonvulsant medication in the form of dilantin-sodium and luminal, 1½ grains of each three times daily.

Three of the acutely ill Hirsch patients died. For none of these, however, did the clinical records indicate infectious hepatitis to be the primary cause of death. Three deaths were also reported from the Hawley isolation unit, 2 of patients more than 80 years old and the other 75. Here again, there was no indication in the records that infectious hepatitis was a factor in the deaths.

Gamma Globulin

Other workers (4) have reported that gamma globulin administered during infectious hepatitis epidemics has provided a high degree of protection to exposed persons.

As a preventive measure at Hirsch Cottage, 5 cc. of gamma globulin was administered to each noninfected resident on December 1, 1953. Personnel working at Hirsch (and later at the other affected cottages) were offered the same dosage on a voluntary basis, with most of them consenting to the injection.

On December 14, the remaining 242 noninfected patients at Hirsch and the employees received another 5 cc. of gamma globulin.

This attempt to control the epidemic was only moderately successful since 37 new cases devel-

oped subsequently among patients thus treated, the last one on February 13, 1954. They occurred the following dates :

| <i>Date</i> | <i>Cases</i> |
|-----------------------|--------------|
| Dec. 15-31, 1953..... | 21 |
| Jan. 1-14, 1954..... | 11 |
| Jan. 15-31, 1954..... | 4 |
| Feb. 1-13, 1954..... | 1 |

No gamma globulin was administered to any of the Hawley or Holden residents. But the Hawley patients with infectious hepatitis received 2 grams of achromycin daily for 5 days, while the other residents received a prophylactic dosage of 1 gram of achromycin daily for 10 days. None of the Holden residents received achromycin.

The 171 noninfected residents at the Wilson and annex units were given 5 cc. of gamma globulin. No further outbreaks were reported at either location.

Neither gamma globulin nor achromycin was administered to the residents of Kilbourne and of the affected wing of the administration building. No new cases were noted at these locations.

Psychiatric Improvements

One of the outstanding developments noted in the course of the epidemic was a marked psychiatric improvement among patients in isolation wards. Similar improvement was reported by Galioni and associates (5) in a study under comparable conditions. While on isolation status, the patients enjoyed greater personal attention than they ordinarily received in the overcrowded units.

Patients who had been in need of toilet training or had been untidy and preoccupied with their excretions prior to their transfer to the isolation units often conquered these shortcomings within 48 hours. Many who had been mute and uncommunicative and were unable to verbalize attempted to make their wishes known to attending personnel within 3 to 5 days after arrival. Many months of intensive psychotherapy would have been required to achieve a similar reaction.

This transient improvement was emphasized by the relapse of the patients into their former condition when special attention and personnel

were withdrawn on the return of the patients to their original wards.

On the other hand, no further mental deterioration was noted in the patients during or following the disease, even among the senile group, although such sequelae were reported by Noyes (6).

Summary and Conclusions

During the fall and winter of 1953-54, 100 cases of infectious hepatitis in adult mental patients were observed and treated at the Elgin (Ill.) State Hospital.

The highest incidence of cases, 98 out of 100, appeared in cottages housing the more deteriorated and untidy patients; 62 were discovered in a residence for severely regressed women possessing poor personal hygienic habits and living under grossly overcrowded conditions.

No uniform pattern of attack could be determined such as appearance of groups of cases at periodic intervals.

The lack of incidence among hospital employees caring for the patients was ascribed to high standards of personal hygiene and sanitation among the personnel.

The vehicle of contamination or mode of transmission was never ascertained, although exhaustive and continued investigation excluded, we believe, the water and food supplies and the sewage disposal system as the source. The fecal-oral route is suspected, but the area of spread also points to person-to-person contact with a carrier as a likely mode of transmission.

Marked psychiatric improvement was observed among patients transferred from overcrowded wards to isolation units or convalescent centers where they received greater individual attention and consideration. The gains were lost on return to their regular quarters.

The success reported with the use of gamma globulin in the early exposure stage during similar epidemics was not duplicated at Elgin Hospital. Thirty-seven cases developed at Hirsch Cottage during a period of 61 days following inoculation. Equivalent cessation of the secondary attack rate was experienced at Hawley and Holden where no gamma globulin was given. No spread of the disease occurred at the units housing the sporadic cases regardless

of gamma globulin administration. Possibly this agent is not as efficacious for deteriorated mental patients possessing low standards of sanitation as for other groups.

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